Day One, Group B, Energy Problems

Row 1, Extraction, Near-term Problems

- Extraction turns good water into bad
- Interrelationship between energy supply and water
- Acid mine drainage impacts on watersheds
    - Current issues
    - Legacy issues
- Costs of treatment—mine drainage
- Shift of problems from east to west re: coal mining and use
    - Related to clean air act compliance

Row 1, Extraction, Long-term Problems

- Economics of extraction
    - Low hanging fruit is gone or going (related to fossil fuels)
- What do we substitute for the resources that are dwindling?
- Changing market forces
    - Water is not factored into the planning for energy … where will water supply come from?

Row 2, Fuel Production, Near-term

- Use of water for ethanol/biodiesel—uses a lot of water for growing feedstock

Row 2, Fuel Production, Long-term

- Hydrogen economy will increase water use

Row 3, Electricity Production

- Transmission line siting problems (near and long-term)
- Lack of planning wrt transmission lines
    - Who pay for lines? Risk.
    - Locate plants by the fuel or by the water?
- Interbasin transfers and potential impacts on energy generation from hydro
- Low water cooling technologies are more expensive and less efficient
- Costs of water not adequately considered in energy cost modeling
- Balance of hydro generation vs competing uses (environmental/recreation)

Row 4, Renewables

- Costs of renewable technologies
    - Ocean thermal
    - Wind
- Biosolids

Row 5, Other

- Complex legal system/water laws

- Lack of knowledge/data about water supply and demand—how much is there, where is it going, quality?
- Lack of integrated tools to do modeling of above/integration of tools
- Competing uses on demand side
- Lack of public awareness/education
- Lack of long-term planning and consideration of interdependence between water, energy, solid waste, air—integrated resource planning (be sure to include water)
- Value of water—not taken into account—lack of inclusion of long-term impacts

Water Problems

- Interbasin transfers impacting TVA in future?
    - Social, energy, environmental issues
    - Economics—what to charge for water
    - Surface impact
- Overallocation
    - Cities documenting water use before rural areas leads to conflicts between rural/urban
- Environmental impacts
    - Reservoirs and environmental impacts on wetlands (Inc. over time)
- Effluent from urban use
    - Pavement reduces infiltration
- Pumping groundwater leads to saltwater instruction (increasing over time)
- Energy needed to produce drinking water is going up; includes moving water and treating water (increasing over time)
- Changing land use patters impact water quality (e.g. less nitrates in rivers, more industrial pollutants)
- Not charging for water value that is commensurate with the services provided or the water value
- Lack of common metrics from one sector to another (costs)
- Impacts of climate change on hydrologic cycle—lack of uncertainty of impacts and results (rising sea level, rain patterns)

Row 6, Urban Use

- Degrading/aging/inefficient infrastructure and delivery systems within urban areas
    - Leaking pipes, losses. Etc. (increasing over time)
- Costs of water sold do not cover costs of maintaining old systems—2x to 4x rate increase to do this—no political will
- Lack of new infrastructure
- Groundwater withdrawals
    - Depletion of groundwater is increasing demands on surface water

Cross-cutting

- Lack of knowledge/understanding of hydrologic cycles over time (LT issue)

- Lack of prioritization of uses between competing sectors and lack of tools/methods/analytic approaches to make decisions (NT issue)
    - Lack of metrics/data—decision makers are not presented with unbiased information
- No futures market/commodity exchange for water

Conservation

- No program with water similar to EnergyStar
- Lack of time of use meters and rates in water supply industry—does not send price signals—limited studies on payback of programs

Row 7, Agriculture

- Biomass and biofuels will lead to increased use of water by ag sector in growth and processing
- Groundwater pumping for ag increasing salinity in soils
- Non-point source pollution impacting surface water quality impacts treatment costs, discharge limits, TMDLs

Rows 8 and 9, Energy

- Environmental impacts associated with running hydro plants and other fossil fuel plants, nuclear plants
- 316B regulations may increase the consumptive use of water (will eliminate once-through cooling) per MWh

Row 10

- How to quantify? Value of recreational and environmental issues? (fisheries, wild rivers)
    - Lack of metrics to value these consistently.